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Notes on the genus *Microcotyle*.

III.

By

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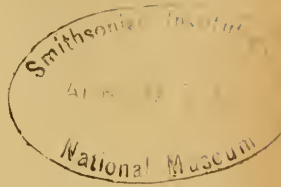
With 3 figures in the text.

M. centropristes n. sp.

This form is found in very limited numbers upon the gills of the sea bass (*Centropristes striatus*), never, so far as observed, being abundant enough to affect the welfare of the host.

The worm is short and thick with a short stubby sucker disc supporting only thirty-five or forty-five suckers which have a chitinous armature quite similar to that of *M. angelichthys*, although much more heavily built and with rather longer lateral spines. These suckers are all quite alike in form and of about the same size.

The mouth is peculiar in that the lips are corrugated and the orifice subterminal. The mouth suckers are relatively large and round, and along the anterior margin there is a row of minute teeth. There is a partition which is often rather indistinct. In some specimens there can be seen a clear sac-like space behind each sucker as though there were a coecum connected with the sucker. The pharynx is muscular and is followed by a rather long oesophagus which divides into the intestinal rami.



The genital cloaca is bowl-shaped, the orifice being directed rather backward. It is lined by many fine sharply pointed spines directed inward and upward and numbering at least eighty: behind these there are two small groups of similar spines. The vas deferens and the uterus may be traced into this bowl-shaped opening. The vagina is very plainly seen as a single median tube leading from a dorsal opening to divide into the two lateral ducts of the vitellarium which then reunite posteriorly to form the vitellarium reservoir. The ovary is very indistinctly outlined. The eggs are thick-walled and deep yellow. They have only very short spur-like processes at each end with no filament, or are rounded at the ends.

There are eight or ten rather large testes. The vas deferens terminates in a rather pyramidal or conical mass in the interior of the cloaca which is bordered by the two small accessory clusters of spines and may represent the cirrus.

Measurements.

Length	3 mm
Width	0,6
Sucker disc	$1,0 \times 0,5$
Suckers	38—45
Testes	8—10
Eggs	0,15 mm in length
No filament	
Diam. of sucker disc	$0,80 \times 0,60$

New York Fish Markets.

M. poronoti n. sp.

The are found pretty regularly moderate numbers of this species clinging to the gills of the Butterfish (*Poronotus triacanthus*) which were brought to the U. S. Fish Commission Laboratories at Woods Hole.

The worm when at rest is about 6 mm long by 1 mm at its widest part. There is a long caudal sucker disc armed with one hundred and twenty suckers which forms about one-third of the whole length of the worm. The suckers are flattened laterally: their chitinous skeleton is in general like that of *M. centropristis* but its lateral spur is very short. In one specimen they are seen from the edge and it is plain that the ends of the main arches are

sharply bent so as to form teeth which give the sucker a better hold. In the anterior lip there are three clumps of cell-like palely stained bodies probably representing sense organs.

The neck is long and graceful. The genital cloaca is oval with a small round anterior opening. The short triangular spines, of which there are a great many, seem to be distributed pretty evenly over the outside of this sac-like structure but are largest and most closely placed about the orifice. Evidently it is a somewhat everlasting sac. Behind it there is seen an olive shaped mass which is the termination of the rather muscular vas deferens and which must therefore represent the cirrus. It is flanked on either side by a group of about fifteen spines and in front of it there is apparently a separate opening.

The ovary is placed more or less across the middle of the worm and is not very large. The oviduct can be plainly seen to be joined by the neck of the seminal reservoir which lies posterior to it on the left side of the worm, and by the vitelline duct after which it passes into the shell gland and the uterus. The eggs occur in small number, usually one or two only, and are provided with rather short stout prolongations at each end. There is no long finely coiled filament as in some other forms.

There are thirty-two rather large testes from which the somewhat thickwalled vas deferens runs forward.

Measurements.

Length	6 mm
Width	0,80
Sucker disc	2,50
Number of suckers	120
Diameter	0,05
Number of testes	32
Eggs	$0,31 \times 0,04$
Anterior filament	0,24
Posterior filament	0,07

U. S. Fish Commission. Woods Hole.

M. pomocanthi n. sp.

In describing *M. angelichthys* in a previous paper it was stated that in its structure that worm resembled in many points others to

be described later, and it is on account of the close resemblance of at least six of these forms that we have hesitated to publish their description until it could be more definitely ascertained whether they really belong to one species or to several. *M. angelichthys* differed from all of these six worms in the possession of a globular ovary and was therefore set down as a distinct species.

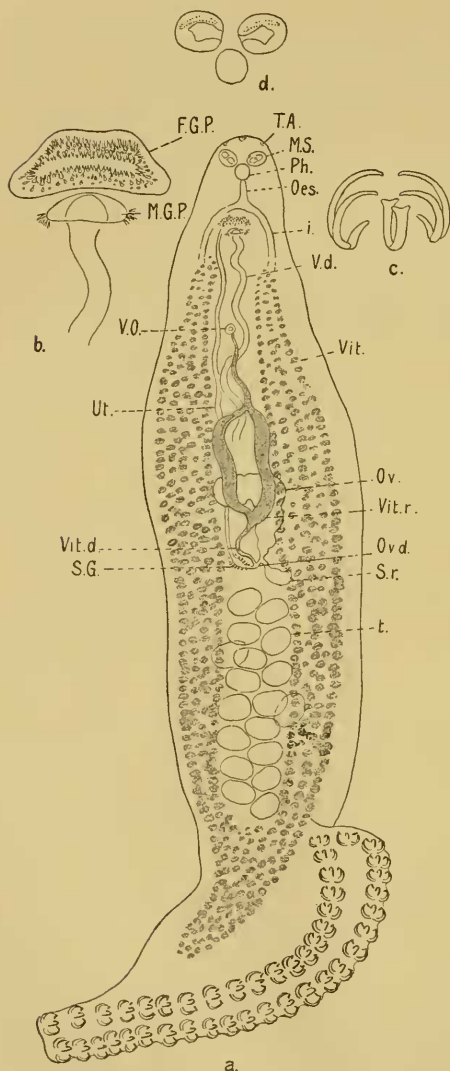


Fig. A.

- C Cirrus
 C. d caudal disc
 F. G. P female genital pore
 G. P genital pore
 i intestine
 M mouth
 M. G. P male genital pore
 M. S mouth sucker
 Oes oesophagus
 OOt ootype
 Ova egg
 Ov ovary
 Ov. d oviduct
 Ph pharynx
 S. C caudal disc sucker
 S. G shell gland
 S. r seminal reservoir
 t Testes
 T. A Tactile area
 Ut uterus
 Va vagina
 V. d Vas deferens
 Vit vitellaria
 Vit. d Vitelline duct
 Vit. r Vitelline reservoir
 V. O vaginal opening

Fig. A.

- a *Microcotyle centropriestes* n. sp.
 b Male and female genital pores.
 c Chitinous frame of a caudal sucker.
 d Mouth sucker.

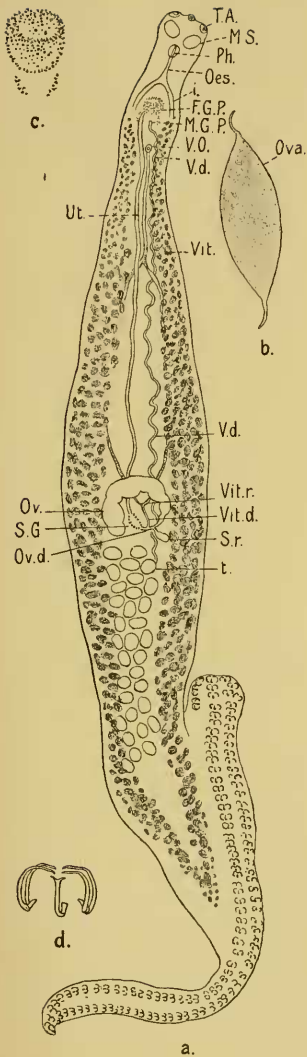


Fig. B.

Fig. B. a *Microcotyle poronoti*. b Ovum. c Female genital pore. d Chitinous skeleton of a caudal sucker.

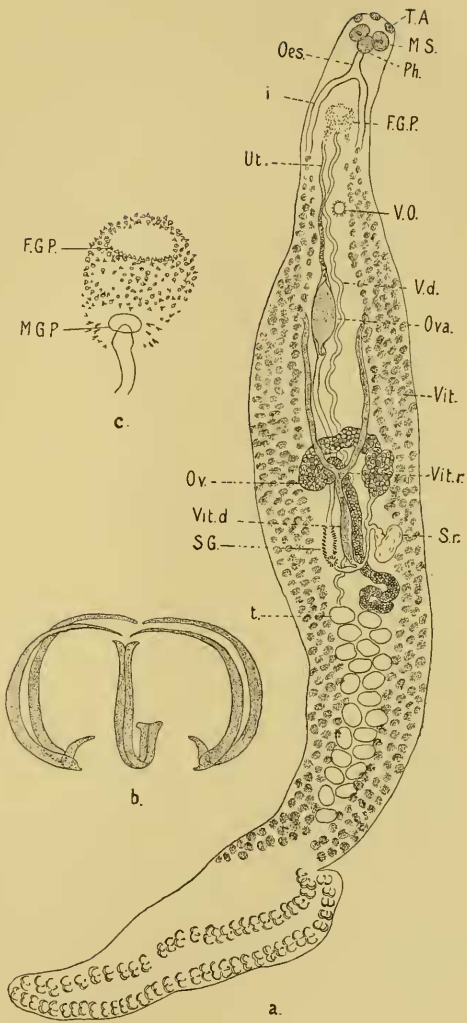


Fig. C.

Fig. C. a *Microcotyle pomocanthi*. b Chitinous skeleton of a caudal sucker. c Genital pores, male and female.

In the course of examining many fish of various sorts, worms belonging to the genus *Microcotyle* were found attached to the gills of the Black angel fish (*Pomocanthus arcuatus*), the Butterfly fish (*Chaetodon ocellatus*), the small Butterfly fish (*Chaetodon capistratus*), the Grass porgy (*Calamus arcifrons*), the Pork fish (*Anisotremus virginicus*), the Yellow finned grouper (*Epinephalus flavolimbatus*), and the Spanish hogfish (*Harpe rufa*). These are so much alike that I hesitate to describe them as separate species and even in describing them under one name would point out the remarkable similarities which exist between them and *M. caudata*, *sebastes*, *elegans* and even *stenotomi* of Goro. It is true that these four species of Goro differ among themselves slightly in size, in the number of suckers and in the number of testes but otherwise they are remarkably alike. Furthermore it is clear from the study of immature forms that the size, number of suckers and number of testes increase with age. Naturally one might suppose that if the worms are quite mature a constant number would be attained but it is common enough to find worms of various sizes and ages upon the gills of the same fish and difficult to decide which of these is quite mature. Therefore such numbers seem hardly acceptable as criteria of specific differences and are not to be compared in importance with the marked differences in form of the suckers, genital armature etc. which form the basis for most cases of specific differentiation.

For that reason it is with the idea of a later and more careful revision of this whole group and because the forms do not correspond very closely with Goro's that they are described together under one specific name.

All of these worms are about 3,5—4,5 mm $\times$ 0,6—0,7 mm in size with a sucker disc which curves up backward and is furnished with fifty to seventy-five suckers ranged along the ventral margin and projecting laterally on short stalks. These suckers have a rather delicate chitinous skeleton of the form shown in the drawing with short lateral spur and are uniform in character.

The mouth suckers are unarmed and obliquely placed at the sides of the mouth. They are divided by a partition. The mouth is slightly subterminal with an overhanging lip. The pharynx is well developed and leads into a rather short oesophagus which bifurcates into the lateral intestinal coeca.

Just behind the bifurcation is the armed genital opening. In

all the worms this presents the appearance seen in the drawing, — an oval or nearly spherical bulbous mass covered over with minute spines which point backward and extend into the eversible small orifice which forms the outlet for the uterus. Behind this there is a second aperture for the small conical cirrus-like end of the vas deferens. This is guarded on each side by an elongated group of about ten or twelve similar short spines.

The ovary is a somewhat indefinite elongated sac crossing the middle of the body and extending backward. — Its oviduct receives the channel from the clearly defined seminal reservoir and that from the vitelline duct and passes through the shell gland into the straight uterus.

The vaginal orifice is median and dorsal and the vagina divides some distance behind this to join the vitelline ducts which run back laterally receiving branches from the vitellarium to reunite in forming the vitelline reservoir which sends its duct to join the oviduct.

The eggs, one or two in number, are provided posteriorly with a rather stout tapering prolongation, anteriorly with a similar structure which is elongated, however, into a very long and delicate tangled and coiled filament. The testes vary in number from eighteen to twentyseven and send as usual the undulating vas deferens through the mid line of the body forward to the genital opening.

Measurements.

Length	3,5—4,5 mm
Width	0,6—0,7
Length of sucker disc	7—1,0
Suckers	50—78
Size of Suckers	0,30×0,2
Eggs	0,12×0,08
Testes	18—27

New York Aquarium.

Many of the fish belonging to the families Chaetodontidae, Sparidae and Haemulidae which I have obtained from the New York Aquarium have been found infected with the *Microcotyle* just described. So severe is this infection that it may be said to have been the cause of death in many instances especially in the Chaetodontidae where it is almost universal.

As I have said in a former paper, certain worms seem to be limited to particular families of fish but it is impossible to say whether fishes in the wild state are as badly infested as those in confinement. It may be that the fish in this group belonging to different genera acquire their infestation with this particular worm from infected tanks even though all ordinary precautions are observed to keep them clean — a point which we shall attempt to clear up.
